

III B. Tech II Semester Regular/Supplementary Examinations, October/November - 2020
WATER RESOURCES ENGINEERING-I

(Civil Engineering)

Time: 3 hours

Max. Marks: 70

- Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
 2. Answer **ALL** the question in **Part-A**
 3. Answer any **FOUR** Questions from **Part-B**

PART -A

(14 Marks)

1. a) Highlight the hydrological data required for proper analysis of Water Resources Projects. [2M]
- b) What are the factors affecting the process of infiltration? [2M]
- c) State the applications and limitations of the Unit Hydrograph. [2M]
- d) Enumerate the effects of floods. [3M]
- e) Define the terms: Porosity, Specific Yield. [3M]
- f) List out the advantages of conceptual models. [2M]

PART -B

(56 Marks)

2. a) What are the various forms of precipitation? Explain briefly. [7M]
- b) Write down the general expression for intensity-duration relationship of rainfall. [7M]
Explain the necessity for frequency analysis.
3. a) Estimate the evapotranspiration using Modified Penman Method for the following data:- Month: August, latitude:25°N, Elevation:250 m above means sea level, max temperature:48°C, minimum temperature:22.5°C, actual sunshine hours:8.5h, wind velocity at 3.75 m height:164 km/day, mean relative humidity:65%. Assume any other data suitably. [7M]
- b) Explain in detail any two methods for controlling evaporation. [7M]
4. a) State and explain the 'Rational Method', which is used for computing the peak rate of runoff for the design of urban stormwater drains along with the limitations of this method. [7M]
- b) The ordinates of the 6-hour hydrograph of a catchment are given below. If two storms, each of unit rainfall excess in 6 hours duration, reach the catchment in succession, then draw the hydrograph resulting from these two storms. The stream may be assumed to have a uniform base flow of 5.0 cumec. [7M]

Time (h)	0	6	12	18	24	30	36	42	48	54	60	66
Ordinate of 4-h U.H (cumec)	0	20	50	160	130	80	70	50	30	20	10	0

5. a) What is meant by 'flood routing through reservoirs'? Explain the step-wise procedure adopted for flood routing by Puls Method. [7M]

- b) The annual flood series for a river is available for 20 years. The observed flood peaks are as given below. Calculate the 100-year flood using Gumbel's method and plot the theoretical frequency curve obtained by using the frequency factor and compare it with the frequency curve of observed data. [7M]

Year	Flood Peak (cumec)	Year	Flood Peak (cumec)
1965	3500	1975	7700
1966	7800	1976	5125
1967	6400	1977	9675
1968	28,345	1978	8240
1969	7980	1979	7990
1970	9866	1980	8390
1971	12087	1981	9120
1972	19867	1982	4520
1973	18745	1983	14092
1974	9875	1984	10837

6. a) During a recuperation test, the water level in an open well was depressed by pumping by 4.5 m and is recuperated by an amount of 2.5 m in 80 minutes. Determine the yield from a well of 4.25 m diameter under a depression head of 4.0 m. Also, determine the diameter of the well to yield 25 l/sec under a depression head of 3.5 m. [7M]
- b) Detail Dupit's assumptions for obtaining general equations governing groundwater flow. [7M]
7. a) What are the various parameters required to adopt rainfall-runoff modeling? Explain all in detail. [7M]
- b) Explain the importance of Hydrological models over the conceptual model in the appropriate analysis of Advanced hydrological concepts. [7M]
